

H.S. John.

Rhodora

JOURNAL OF THE
NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

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Vol. 27.

September, 1925

No. 321.

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Boston, Mass.

300 Massachusetts Ave.



Providence, R. I.

Preston and Rounds Co.

RHODORA.—A monthly journal of botany, devoted primarily to the flora of New England. Price, \$2.00 per year, postpaid (domestic and foreign); single copies (if available) 20 cents. Volumes 1-8 or single numbers from them can be supplied at somewhat advanced prices which will be furnished on application. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be gladly received and published to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than one page of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

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Subscriptions, advertisements, and business communications to

W. P. RICH, 300 Massachusetts Avenue Boston, Mass

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THE NEW ENGLAND BOTANICAL CLUB

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CORTINARIUS CYANITES IN THE UNITED STATES.¹

LOUIS C. C. KRIEGER.

(*Plates 151, 152.*)

ON July 16, 1906, the writer was walking with some friends in a forest near Chocorua, New Hampshire. While discussing the colors of fungi, one of the party remarked, "I have never seen a blue mushroom." These words were scarcely uttered, when, much to our delight, a specimen of that hue was espied. It proved to be one of the rarest as well as one of the most beautiful of *Cortinari*.

A colored sketch was prepared without delay (Pl. 151), and the following notes made.

"*Cortinarius* species. Single, young specimen. Chocorua, N. H. Among dead leaves. July 16, 1906. Grew on the left of the path that leads from the Chocorua River rustic bridge to Hayford's farm.

"Pileus (before expansion) 6 cm., convex, pale grayish-blue, smooth, appressedly and radiately fibrillose, the center inclining to a light, livid brown; the margin incurved and exceeding the gills, finely fibrillose, the fibrils interlaced and of a light cinnamon-brown (spores deposited?).

"Gills concolorous, but of a deeper shade of blue, quite close; edges very pale, crenulate.

"Stem 14 cm. long, 2.2 cm. thick at the apex, gradually enlarged downwards; basal bulb 5.5 cm. thick, tapering to a dull point. Exterior of stem concolorous, except at base which is reddish violaceous; all but the base covered with fibrils that are gathered together to form little, transverse, wave-like fascicles; apex not so rough; base smooth.

¹ Contribution from The Howard A. Kelly Mycological Library, Baltimore, Md.

"Coloring of interior. Flesh whitish at first, changing speedily to blood-red, finally to a dirty tint. The red color is especially noticeable in the base, from which a red juice can be pressed. Under the cortex of the median portion of the stem the blue is retained."

The spores were not measured, but their shape is shown in the plate. From the drawing it is also evident that they were uni- to tri-guttulate. Their color, as seen by transmitted light under the microscope, was a light yellow-brown. The epispore was smooth, not verrucose. The specimen was not kept, but the colored plate, from which the present reproduction was made, is preserved in the Howard A. Kelly Mycological Library.

With the aid of these notes, and the plate, the plant was identified as *Cortinarius cyanites* Fr. There are, however, several explainable discrepancies. Fries (5 and 6) says that the stem is smooth (*laevigatus*). His figure (7) represents a fully developed plant. The stem is without adornment, except in the lower, basal portion where a dense covering of light-blue fibrils appears in the contour of the figure that gives a general view. Gillet's plate (8), on the other hand, might have been drawn from our specimen, so close is the resemblance. The stem shows the peculiar, transverse fiber-fascicles. Further, the spores, according to Ricken (12), should be verrucose, yet, bearing in mind what Kauffman (9) says of *Cortinarius* spores in general ("when young the epispore is smooth"), it is clear that the plant was too immature to have developed this common *Cortinarius* character.

Secretan's description (13), under *Agaricus cyanus* Pers., apparently the first ever published, covers our plant, with unimportant differences. Berkeley and Broome (2) speak of it as a "magnificent species," and as "one of the finest of the genus." Rea (11) says the stem is fibrillose. Bataille's plant (1) is ours. Quélet (10) regards it as a luxuriant variety of *C. alboviolaceus*.

Having determined the plant to our satisfaction, it was discovered that *C. cyanites* is mentioned but once in American mycological literature, so far as we could learn. In 1903, my esteemed colleague, Miss Jennie F. Conant, secretary of the Boston Mycological Club, published the name in a list of fungi exhibited at Horticultural Hall, Boston, during the summer and autumn of 1902 (3). Miss Conant has since informed the writer that the Club's herbarium contains four specimens of the species, only one of which is mature. They

were collected at Alstead, N. H., July 25, 1902, by my friend, Mr. Hollis Webster, who states (in litt.): "I cannot remember whether Dr. Farlow had a specimen. The determination was mine originally, but probably he confirmed it." The late Mr. George B. Fessenden, whose name appears on the herbarium label, and who, for many years, was president of the Boston Mycological Club; merely communicated the plants to one of that year's exhibitions.

The Club's herbarium also preserves a lantern-slide from a negative made by Mr. Webster, showing three of the specimens in the fresh state. The figures (Pl. 152), made from this slide, demonstrate that the Alstead and Chocorua plants are unquestionably identical as to external structure. The figure of the fully developed plant, on the extreme left of our plate, shows that the roughness on the stems of young specimens disappears with age.

Through the kindness of Miss Conant, the writer was permitted to examine a fragment of a gill from this mature specimen. Under a one-twelfth, oil-immersion objective, the spores were seen to vary as to roughness, younger ones showing a smooth epispore, while fully matured ones were tuberculate. Some, of intermediate size, were part rough and part smooth. Frequently the roughness would appear as a granulation within, while the contour, in optical section, was perfectly smooth. They measured $5.5-6.6 \times 10 \mu$. Cooke's measurements (4) are $5-6 \times 10 \mu$.

On the basis of the above facts, it is safe to claim this extremely rare and exceptionally beautiful *Cortinarius* as a United States species.

1406 EUTAW PLACE, BALTIMORE, MD.

EXPLANATION OF PLATES

Pl. 151. *Cortinarius cyanites* Fr. from Chocorua, N. H. Reproduced from a photograph of the writer's painting of the actual specimen.

Fig. 1. Young plant, Fig. 2. Section of the same. Fig. 3. The spores.

Pl. 152. *Cortinarius cyanites* Fr. from Alstead, N. H. Reproduced from a photograph made from a lantern-slide.

Fig. 1. Mature specimen. Fig. 2 and 3. Younger specimens.

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THE AMPHIBIOUS GROUP OF POLYGONUM, SUBGENUS PERSICARIA.

E. E. STANFORD.

(Continued from page 152.)

KEY TO THE AMPHIBIOUS PERSICARIAS OF EUROPE AND AMERICA.

Plants perennial, more or less amphibious: flowers dimorphous as to stamens; these members accordingly strongly exserted or much reduced and included; the two types usually segregated on different plants; long-stamened flowers almost invariably sterile and the short-stamened frequently so.

- a. Aquatic forms; stems floating or somewhat emersed: leaves glabrous (becoming more or less hirsute in transition-forms), elliptic or oval b.
- b. Margins of leaves armed with short harsh bristles
 - 1a. *P. amphibium* f. *natans*.
- b. Margins naked or with weak hairs or bristles c.
- c. Peduncle glabrous: panicle ovoid, 1-5 cm. long
 - Panicle 1-3 cm. long: fruiting calyx not over 6 mm. long.....2a. *P. natans* f. *genuinum*.
 - Panicle 4-5 cm. long: fruiting calyx 6-7 mm. long.....2c. *P. natans* var. *insigne*.
- c. Peduncle hairy: panicle cylindric, 3-10 cm. long
 - Leaves mostly cordate: internodes not inflated nor tapering upward.....3b. *P. coccineum* f. *natans*.
 - Leaves mostly rounded or acutish at the base: internodes inflated or tapering upward...3c. *P. coccineum* var. *rigidulum*.

Fernand nosterall to the an sp. P. amphibium
see p. 160

- a. Terrestrial forms; stems upright and leafy: leaves rarely glabrous, mostly more or less hairy *d*.
- d. Ocreae without herbaceous margin *e*.
- e. Leaves harshly scabrous with short (1 mm. or less) stiff hairs.....1b. *P. amphibium* f. *terrestre*.
- e. Leaves glabrous or pubescent or hirsute with weak hairs (mostly 1-2 mm. long)
- Panicles mostly 4-18 cm. long: petioles mostly attached midway of the ocreae; plant usually rather densely (often minutely) pubescent or canescent
- 3d. *P. coccineum* var. *pratincola*.
- Panicles mostly 4-8 cm. long: petioles attached near the base of the ocreae: plant very variable as to pubescence, sometimes nearly glabrous (except the peduncle).....3a. *P. coccineum* f. *terrestre*.
- d. Ocreae with herbaceous margins.....2d. *P. natans* f. *Hartwrightii*.

1. POLYGONUM AMPHIBIUM L. Sp. Pl. 361 (1753). Perennial; aquatic, emersed, or terrestrial.

1a. Forma ***natans*** (Moench), comb. nov. Stems rhizomatiform, floating, submerged, or on the bottom of ponds, lakes, etc., becoming erect as the plant passes to the forma *terrestre*, rooting at the somewhat constricted nodes; internodes 5-10 cm. long.

Leaves floating, elliptic-lanceolate, 2-4 cm. wide, 8-12 cm. long, coriaceous, glabrous on both surfaces, shining above; base acute and slightly inequilateral, rounded, truncate, or slightly cordate; apex acute or obtuse when young, becoming obtuse; margin entire or slightly undulate, usually armed with short stout appressed bristles and harsh to the touch, rarely naked; lateral veins of mature leaves nearly straight and meeting the mid-vein nearly at right angles; petioles 3-8 cm. long, slender, flexuous, flattened, attached at the central or upper portion of the ocrea.

Ocreae 1-2 cm. long, thin-membranous, glabrous, rounded-truncate, ciliate.

Inflorescence erect, usually single, occasionally with subordinate branches: peduncle glabrous: panicle dense-flowered, cylindric, 1-5 cm. long: ocreolae 3-4 mm. long, thin-membranous, inconspicuous, rounded-rhombic or deltoid: fascicles 2-3-flowered, the bracts persistent, thin-membranous: flowers heterostyled, the types usually on separate plants; pedicels mostly 1 mm. long or less.

Long-styled flowers. Calyx pink or rose, 3-4 mm. long, 5-parted to about $\frac{3}{4}$ its length; the segments rounded, narrow-ovate: calyx opening briefly, becoming slightly accrescent and flattened-ovoid in fruit: stamens 5, much reduced, about 1.5 mm. long; anthers shrunk, nearly or quite devoid of pollen: style 3.5-4 mm. long, two-parted to below the middle; the lobes exerted about 1 mm. and diverging: stigmas capitate: nectaries 5, below and alternating with the filaments.

Short-styled flowers. Opening more widely: stamens 3.5-4.5 mm. long, strongly exerted; anthers usually fully polliniferous: ovary reduced: style 3 mm. long, its tips with the flattened-capitate stigmas slightly exerted: pollen usually normal.

Achene 2-2.2 mm. wide, 2.5-3 mm. long, nearly orbicular, much exceeded by the calyx, minutely protuberant at base, thick-lenticular, minutely roughened and rather dull.

P. amphibium var. *natans* Moench, Enum. Pl. Hassk. 28 (1777), not *P. amphibium* Michx. and Am. authors.

Widespread in slow waters throughout Europe.

1b. Forma TERRESTRE (Leers) Moss. Camb. Brit. Fl. ii. 115 (1914).

Emersed or growing on margins of ponds, rivers, or wet places, more rarely in dry localities. Branches upright from a repent or rhizomatiform stem, often appearing on extensions of an aquatic stem in shallow water or on banks; internodes 4-5 cm. long.

Leaves lanceolate, 1-3 cm. wide, 10-18 cm. long, subcoriaceous; upper surface and margin scabrous with close appressed short (1 mm. or less) stiff sharp bristles; lower surface less scabrous with weaker bristles; bases cuneate, rounded, or narrowly cordate; apex long-attenuate; leaves borne at an acute angle on a short (0.5-1 cm.) stiff petiole from near the top of the ocrea.

Ocreae 1.5-2.5 cm. long, closely cylindric, wrinkled, minutely strigose; the margin above the attachment of the petiole scarious and tending to disappear in part, leaving the vascular bundles projecting like cilia: ocreae sometimes adherent to or coalescent with the epidermis.

Inflorescence (rarely produced and then mostly sterile) usually a single terminal panicle, sometimes with subordinate branches: peduncles minutely hairy: the hairs often with inconspicuous glandular tips.

Polygonum amphibium var. *terrestre* Leers, Fl. Herborn. 98 (1775) and of European authors; not of S. F. Blake, RHODORA, xv. 164 (1913), which is *P. natans*, forma *Hartwrightii*. *Persicaria amphibia* var. *terrestre* S. F. Gray, Nat. Arr. Brit. Pl. ii. 268 (1821).

Emersed or terrestrial, common throughout Europe. A single introduction known in North America, which is represented by the following: NOVA SCOTIA: roadside bank in rubbish near railroad, Yarmouth, September 1, 1920, Bissell, Long & Linder, no. 21,064.

2. *P. NATANS* A. Eaton, Man. Bot. ed. 3: 400 (1822). Perennial: aquatic, emersed, or terrestrial.

2a. Forma **genuinum**. Stems floating or more or less submersed and rooting at the bottom, becoming erect and passing into the forma *Hartwrightii* in shallow water, rhizomatiform, 0.5-0.7 cm. in diameter; nodes slightly swollen; internodes 5-10 cm. long.

Leaves elliptic or elliptic-oval, becoming lanceolate as the plant approaches the forma *Hartwrightii*, 2-4 cm. wide, 7-12 cm. long, thinly coriaceous, glabrous on both surfaces, shining above, often reddened; base rounded, or somewhat inequilaterally acute at the junction with the petiole; apex rounded, more rarely acute; margin entire, usually unarmed, becoming weakly scabrous with short appressed hairs in transition forms; side veins of mature leaves meeting the midvein at an angle of about 60° and curving toward

the margin: petioles slender, flexuous, flattened, 1–6 cm. long, attached to the upper portion of the ocrea.

Ocreae thin-scarious, close-cylindric, obliquely truncate; the margin scarious or in transition forms becoming herbaceous.

Inflorescence erect, usually a single panicle, or occasionally with the peduncle giving off inferior branches below; peduncle glabrous, 5–6 cm. long, much ridged in drying: panicle 1–3 cm. long, ovoid or short-cylindric, dense-flowered: ocreolae 3–4 mm. long, elongate-triangular and acute, thin-membranous, inconspicuous: flowers heterostyled, the types usually segregated on separate plants.

Long-styled flowers. Calyx pink or reddish, 3–4 mm. long and narrow-ovoid, becoming slightly longer and broader-ovoid in fruit, 5-parted to below the middle; the lobes rounded: stamens 5, usually much reduced, 1–2 mm. long; anthers shrunken and mostly devoid of pollen, included: style 3–4 mm. long, 2-parted nearly to the middle; the branches exserted and diverging; stigmas capitate: nectaries 5, alternating with and below the attachment of the filaments.

Short-styled flowers. Opening more widely and more or less permanently: stamens 4–6.5 mm. long, strongly exserted: anthers fully polliniferous and soon deciduous: ovary reduced, rarely or never developing further: style 3–3.2 mm. long: the branches and stigmas exserted but usually less so than the stamens: pollen usually with a considerable proportion of defective grains.

Achene 2.5–2.7 mm. wide, 2.5–2.7 mm. long, nearly orbicular, thick-lenticular, minutely pitted and rather dull; the faces strongly convexed; the base slightly constricted or disciform.

Polygonum natans A. Eaton, Man. Bot. ed. 3: 400 (1822), ed. 4: 404 (1824), ed. 5: 338 (1829). *P. fluitans* Eaton, Man. ed. 6: 274 (1833), ed. 7: 450 (1836); Eaton & Wright, N. A. Bot. 368 (1840). *P. coccineum* Bigelow, Fl. Bost. ed. 2: 157 (1824); not Muhl. in Willd. Enum. Hort. Berol. 1809). *P. amphibium* var. *natans* Michaux, Fl. Bor. Am. i. 240 (1803); Meisner, Monog. Gen. Polyg. Prodr. 67 (1826); Hooker, Fl. Bor.-Am. ii. 131 (1838); Wood, Cl. Bk. Bot. 324 (1845); not Moench, Enum. Pl. Hass. 28 (1775). *P. amphibium* var. *aquaticum* Torrey, Fl. No. & Mid. U. S. i. 404 (1824) and Comp. Fl. No. & Mid. States 172 (1826); Beck, Bot. N. & Mid. States, 30 (1833); Gray, Man. 388 (1848), ed. 5: 416 (1867); Wood, Cl. Bk. Bot. 609 (1880); not Leysser, Fl. Hals. ed. alt. 95 (1783). *P. amphibium* Small, Monog. N. A. Polyg. 40, t. 7 (1895); Robinson & Fernald in Gray, Man. ed. 7: 360 (1908); and many other Am. authors, not L. Sp. Pl. 361 (1753). *Persicaria fluitans* (Eaton) Greene, Leaflets, i. 26 (1904). *P. plattensis* Greene, loc. cit. 29 (1904). *P. oregana* Greene and *P. lactevirens* Greene, loc. cit. 31 (1904). Probably including others of Greene's species of which types have not been available.

In pools and slow waters, Newfoundland, Prince Edward Island, Magdalen Islands, Nova Scotia, Quebec, southward to Pennsylvania

and across the continent; in the Pacific States southward to and throughout California.

The following are characteristic. NEWFOUNDLAND: sandy and gravelly shores of ponds, headwaters of Rocky River, Avalon Peninsula, *Fernald & Wiegand*, no. 5369; shallow pool near river, Bishop Falls, *Fernald & Wiegand*, no. 5348; shallow water near margin of Rushy Pond, *Fernald & Wiegand*, no. 5350. QUEBEC: dried-up swampy hole, mouth of Grand River, Gaspé County, *Collins, Fernald & Pease*, no. 5271. MAGDALEN ISLANDS: edge of pond in sand dunes, Brion Island, *St. John*, no. 1861. PRINCE EDWARD ISLAND: shallow border of Cousin's Pond, Malpeque, *Fernald & St. John*, no. 200. NOVA SCOTIA: beach of Shubenacadie Grand Lake, Halifax Co., *Fernald, Bartram & Long*, no. 23,791; in water of marsh, near Pictou, *Howe & Lang*, no. 474; in Plaster-hole Lake, vicinity of Dingwall, *Nichols*, no. 1036. MAINE: Pettiquaggamas (Glazier) Lake, Aroostook Co., *Fernald*, no. 95; Lake Christopher, Woodstock, July, 1887, *Parlin*. VERMONT: Walden, July 4, 1894, *Eggleston*; Castleton, October 3, 1897, *Eggleston*. MASSACHUSETTS: Hinsdale, *S. F. Poole*, no. 288. CONNECTICUT: Southington, *Bissell*, no. 503; Crescent Lake, *Luman Andrews*, no. 7; Flanders Pond, *Andrews*, no. 2; Beaver Pond, Meriden, *Andrews*, no. 17. NEW YORK: Pool northeast of Spencer Lake, Spencer, Tioga Co., *Eames*, no. 3993; partly dried-out soil, Slaterville Swamp, Caroline, Tompkins Co., *Wiegand*, no. 11,972; in water, Chicago Bog, Cortland, Cortland Co., *Eames & Macdaniels*, no. 407; Racquette River, *C. S. Phelps*, no. 398. MINNESOTA: Oshawa, Nicollet Co., July, 1892, *C. A. Ballard*. IOWA: Kossuth County, *Cratty & Pammel*, no. 609. NORTH DAKOTA: Dickinson, September 10, 1908, *W. H. Holgate*. ALBERTA: near Banff, *Macoun*, no. 1481; prairie ponds, Elbow River District, vicinity of Calgary, *M. E. Moodie*, no. 1061. SASKATCHEWAN: *E. Bourgeau*, 1857-8. MONTANA: Hound Creek, *Scribner*, no. 237; Flathead, *MacDougal*, no. 461; Cliff Lake, alt. 7000 ft., *Rydberg & Bessey*, no. 5358. WYOMING: Two Ocean Lake, *Merrill & Wilcox*, no. 1095; bogs, Dunn's Ranch, Albany County, *A. Nelson*, no. 7465. COLORADO: Gunnison, alt. 7680 feet, *Baker*, no. 906. IDAHO: trailing, in marshes, Falk's Store, Canyon Co., *Macbride*, no. 291; shallow water, St. Anthony, *Merrill & Wilcox*, no. 848. NEVADA: Lake Washoe, *J. Torrey*, no. 427. CALIFORNIA: borders of ponds, Bear Valley, San Bernardino Mts., *Parish*, no. 1405a; Donner Lake, Nevada Co., *Heller*, no. 7162; Cuyamaca Lake, *Abrams*, no. 3846. OREGON: Klamath Marsh, alt. 1530 m., *Leiberg*, no. 628; tule of Grande Ronde, *Cusick*, no. 1763; near Ashland, *Applegate*, no. 604; lower Albina, Portland, *Sheldon*, no. 11,327. WASHINGTON: Calispel Valley, *Kreager*, no. 338.

The above were mostly distributed as *P. amphibium*.

2b. Forma **Hartwrightii** (Gray), comb. nov. More or less erect from a rhizomatiform stem; the upright stems much branched and leafy, with a variable degree of pubescence or hirsuteness.

P. amphibium L. var. *stipulaceum* Coleman. 1874.
- this is the real var. of the Am. form. file Fern. Rhod. 48;
50, 1946 - argues well that the Am. ones are not a distinct

Leaves lanceolate, 1–4 cm. wide, 10–15 cm. long, herbaceous, opaque, often glabrous except near the margin, or more or less densely clothed (in the less hairy forms near the margin chiefly) with weak slender flexuous hairs 1–2 mm. long, and rising from somewhat expanded bases; bases rounded or slightly cordate; apex acute or attenuate; margin entire, clothed with slender or slightly harsh hairs; petioles very short (usually 0.5 cm. or less), stout, attached to the middle or lower half of the ocrea.

Ocreae close-cylindric, firmly membranous, 1–2.5 cm. long, wrinkled, hirsute; margins salver-form, herbaceous, and more or less reflexed, about 1 cm. in diameter; the salver-form appendage occasionally wanting.

Inflorescence (rare and usually sterile) mostly terminal.

Polygonum Hartwrightii Gray, Proc. Am. Acad. viii. 294 (1870); Watson, Bot. Calif. ii. 14 (1880); Watson & Coulter in Gray, Man. ed. 6: 441 (1890); Small, Monog. N. A. Polyg. 42, t. 8 (1895); Britton & Brown, Ill. Fl. i. 555 (1896). *Polygonum amphibium* var. *Hartwrightii* Bissell, RHODORA iv. 104 (1902); Robinson & Fernald in Gray, Man. ed. 7: 361 (1908). *Polygonum amphibium* forma *Hartwrightii* (Gray) Blake, RHODORA xv. 164 (1913). *Polygonum amphibium* forma *terrestre* Blake, loc. cit. (1913); Farwell, Ann. Rept. Mich. Acad. Sci. xxi. 365 (1920); not Moss, Camb. Brit. Fl. ii. 115 (1914). *Polygonum amphibium* var. *marginatum* Farwell, Ann. Rept. Mich. Acad. Sci. xxi. 365 (1920). *P. amphibium* var. *marginatum* forma *Hartwrightii* Farwell, loc. cit. (1920). *P. amphibium* var. *marginatum* forma *hirtuosum* Farwell in Papers Mich. Acad. Sci. i. 93 (1923). *Persicaria Hartwrightii* (Gray) Greene, Leaflets i. 24 (1904); probably also *P. abscissa*, *P. asclepiadea*, *P. nebrascensis*, *P. ammophila*, *P. muriculata*, *P. homalostachya*, *P. villosula* and *P. chelanica* Greene, loc. cit., p. 17–50, and *P. carictorum* Nwd. Am. Midl. Nat. ii. 230 (1912).

In swamps, wet places, and sometimes in dry prairies throughout the range of the forma *genuinum*; apparently replacing it, or at least more conspicuous, throughout the middle west and in the Mississippi valley. The following are characteristic. NEWFOUNDLAND: stranded on wet sandy shore of Rushy Pond, Fernald & Wiegand, no. 5351. QUEBEC: vicinity of Longueuil, emersed, Victorin, no. 4263; mouth of Grand River, Gaspé County, August 11–15, 1904, Collins, Fernald & Pease. MAGDALEN ISLANDS: edge of pond in sand dunes, Brion I., St. John, no. 1860. PRINCE EDWARD ISLAND: swale near margin of North Lake, Kings Co., Fernald, Long & St. John, no. 7382; swampy margin of Cozen's Pond, Fernald & St. John, no. 11,048. Lower Sea Cow Pond, Fernald & St. John, no. 7380. MAINE: wet thicket, Dover, September 11, 1894, Fernald; river bank, Van Buren, September 18, 1900, Fernald. VERMONT: Perch Pond, Pownal, Eggleston, no. 329. MASSACHUSETTS: Fresh Pond, Cambridge, September, 1878, Farlow. CONNECTICUT: Beaver Pond, Meriden, Luman Andrews,

no. 17; Shuttle Meadow Lake, Southington, *Andrews*, no. 8. ONTARIO: marshes, Point Edward, *J. Macoun*, no. 54,744. NEW YORK: a series of sheets by *S. H. Wright*, Dundee, Yates Co., and no doubt the Gray types; Lowery's Pond, Junius, *Metcalf*, no. 6459. INDIANA: swamp land, Wolf Lake, *Smith*, no. 5729. MICHIGAN: banks of Indian River, Cheboygan Co., August 12, 1890, *C. F. Wheeler*. WISCONSIN: Green Bay, August 16, 1899, *J. H. Schuette*. ILLINOIS: drained swamp near Wady Petra, *Chase*, no. 191; Fountaindale, *Bebb*. MINNESOTA: Center City, August, 1892, *B. E. Taylor*. IOWA: Ames, August 8, 1874, *C. E. Bessey*. NEBRASKA: 3 mi. northwest of Whitman, *Rydberg*, no. 1293. COLORADO: swampy river bottom, Bedrock, Montrose Co., *Walker*, no. 371. MONTANA: banks of Missouri River, alt. 3100 feet, *Scribner*, no. 238 (as *P. Muhlenbergii*). IDAHO: Priest Lake, *Piper*, no. 3717. UTAH: Rabbit Valley, alt. 6700 feet, *Ward*, no. 617. LOWER CALIFORNIA: Cantillas Mts., *Orcutt*, no. 898.

The above were mostly distributed as *P. Hartwrightii* and *P. amphibium*.

2c. Var. **insigne** (Greene), comb. nov. An extremely robust variety, seen only in the aquatic form. Leaves 3–5 cm. wide, 6–12 cm. long; the lower cordate at the base; panicles 2 cm. thick, 4–5 cm. long; fruiting calyx 3 mm. wide, 7 mm. long; achene scarcely larger than in the type; style-base notably stiff, breaking to leave the achene with a spine-like point: pollen somewhat defective.

Persicaria insignis Greene, Leaflets, i. 32 (1904).

California. The following are typical. CALIFORNIA: aquatic, subalpine, 9180 ft. alt., September 20, 1889, locality not stated, *Wright*; near Lake Tahoe in water ("this variety is common on the eastern slope of the Sierras but very rare west of the crest"), August 29, 1863, *Brewer* no. 2156.

3. *POLYGONUM COCCINEUM* Muhl. in Willd. Enum. Hort. Berol. i. 428 (1809). Perennial; aquatic, emersed, or terrestrial, the latter states the more common.

3a. Forma **terrestre** (Willd.), comb. nov. Emersed or terrestrial: stem becoming erect from a more or less repent or rhizomatiform base, coarse, 1–1.5 m. high, striate, much branched, and leafy, mostly glabrous below, becoming pubescent or clothed with simple or glandular hairs above; nodes much swollen; internodes 4–10 cm. long.

Leaves lanceolate or ovate-lanceolate, 3–6 cm. wide, 10–18 cm. long, herbaceous, subcoriaceous or coriaceous; base rounded, slightly cordate or sometimes cuneate; apex acute or acuminate; margin entire, scabrous with minute appressed bristles; surfaces glabrous with minute bristle-teeth on veins on emersed plants, becoming hairy in varying degrees in those of terrestrial habitat; lateral veins forming an angle of about 60° with the midvein and curving toward the margin; petioles stout, 3–6 cm. long, attached near the base of the ocrea.

Ocreae 2–3.5 cm. long, thin-membranous, appearing inflated at the node, close-cylindric above, sometimes becoming coalescent with

the epidermis, fine-pubescent or hirsute; margin truncate, entire or short-ciliate.

Inflorescence usually terminal, erect: panicle single or more than one, with the lower smaller: peduncles 3–7 cm. long, stout, pubescent with appressed or glandular hairs, or the two mixed: panicles close-cylindric, spicate, 3–10 cm. long.

Ocreolae 3–4 mm. long, rather crowded, brown or reddish, acute, hirsute and fringed with rather stiff appressed hairs: bracts persistent, thin-membranous: fascicles 3–4 flowered: pedicels 1–2 mm. long, scarcely exserted.

Flowers scarlet or pink, heterostyled; the types usually segregated on different plants; the long-styled panicles usually with a low percentage of achene-production; short-styled almost invariably sterile.

Long-styled flowers. Calyx 5-parted, 3–3.5 mm. long, becoming 4–5 mm. in fruit, mostly narrow-ovoid and closed, or opening briefly: stamens 5, 1.5–2 mm. long; anthers reduced and mostly empty: style 3.5–4 mm. long, 2-parted to below the middle, the tips with the capitate stigmas strongly exserted (about 2 mm.): nectaries prominent, alternating with and below the filaments.

Short-styled flowers. Stamens 4–5 mm. long, exserted nearly half their length; anthers usually fully polliniferous (sometimes scantily so); pollen usually with a considerable percentage of defective grains: style 2.5–3 mm. long, exserted.

Achene 2.5–3.3 mm. long, 2.5–3 mm. wide, thick-lenticular, orbicular or broader toward the top, tapering or slightly disciform at base, minutely roughened, opaque, much exceeded by the accrescent calyx.

P. coccineum Muhl. l. c. (1809) and Cat. 40 (1813); Pursh, Fl. Amer. Sept. i. 271 (1814); Nuttall, Gen. N. A. Pl. 255 (1817); A. Eaton, Man. Bot. ed. 2: 259 (1818); Eaton & Wright, N. A. Bot. 368 (1840); Barton, Comp. Fl. Phila. i. 188 (1818); Sprengel, Syst. ii. 259 (1825). *P. coccineum* var. *terrestre* Willd. Enum. Hort. Berol. i. 428 (1809); Pursh, loc. cit. *P. amphibium* Michx. Fl. Bor.-Am. i. 240 (1803), in part; Bigelow, Fl. Bost. ed. 2: 157 (1824); Wood, Cl. Bk. Bot. 324 (1845); Darlington, Fl. Cestr. ed. 3: 246 (1853); not L. Sp. Pl. i. 361 (1753). *P. amphibium* var. *emersum* Michx. loc. cit. (1803). *P. amphibium* var. *terrestre* Torr. Fl. N. & Mid. St. i. 403 (1824); Comp. Fl. No. & Mid. St. 172 (1826); Fl. N. Y. ii. 148 (1843); Meisner, Monog. Gen. Polyg. Prodr. 67 (1828); Darlington, Fl. Cestr. 250 (1837); Hooker, Fl. Bor.-Am. ii. 131 (1839); Gray, Man. 388 (1848); ed. 5: 416 (1867); not Leers, Fl. Herb. 99 (1775). *P. amphibium* var. *Muhlenbergii* Meisner in DC. Prodr. xiv. 116 (1856). *P. amphibium* var. *longispicatum* Peck Ann. Rept. State Bot. N. Y. 1892: 48 (1893). *P. amphibium* var. *coccineum* (Muhl.) Farwell, Ann. Rept. Mich. Acad. Sci. 6: 206 (1904). *P. Muhlenbergii* (Meisn.) Watson, Proc. Am. Acad. xiv. 295 (1879); Watson & Coulter in Gray, Man. ed. 6: 441 (1890); Robinson & Fernald in Gray Man.

ed. 7: 361 (1908). *P. emersum* (Michx.) Britton. Trans. N. Y. Acad. Sci. viii. 73 (1889); Small, Monog. N. A. Polyg. 44 (1895). *P. terrestre* BSP. Prelim. Cat. N. Y. 46 (1888). *Persicaria emersa* (Michx.) Small, Fl. Se. U. S. 376 (1903). *P. coccinea* (Muhl.) Greene, Leaf. i. 24 (1904); Rydberg, Fl. Rocky Mts. 236 (1917). *P. Muhlenbergii* (Meisn.) Small in Rydberg, Fl. Colo. 11 (1906). *P. novae-angliae* Greene, loc. cit. 34 (1904) and probably others of Greene's species of which types are not available.

The following are referred here. QUEBEC: terrains submergés au printemps, Ile Plate, près de Longueuil, *Victorin*, no. 15,777. NOVA SCOTIA: rocky swale bordering Dominick Lake east of Springhaven, *Fernald & Long*, no. 23,793; wet savannah bordering Butler's (Gavelton) Lake, Gavelton, *Fernald & Long*, no. 21,065. MAINE: muddy shore, Orono, September 4, 1893, *Fernald*. MASSACHUSETTS: Small pond at Cataumet, September 15, 1901, *E. F. Williams*; edge of Charles River, in mud and water, Dedham, September 5, 1898, *F. G. Floyd*. CONNECTICUT: Misery Swamp, Southington, *Andrews* no. 1 (in part); East Hartford, September 29, 1902, *A. W. Driggs*. NEW YORK: outlet of Crooked Lake, in dry places as well as muddy, *S. H. Wright*; western central New York, *A. Gray*; Cayuga Marshes, north of R. R. bridge, Seneca Falls, *Thomas*, no. 3994; pool near Fleming Schoolhouse, Ithaca, *Wiegand & Thomas*, no. 2234. NEW JERSEY: swamp near Rosenkranz Ferry, Sussex Co., September 13, 1921, *E. B. Bartram*. PENNSYLVANIA: South river shore, Haines, Lancaster Co., September 1, 1909, *Van Pelt*; in Catskill formation, about Long Pond, Luzerne Co., *Heller & Hallbach*, no. 666. VIRGINIA: Hunting Creek Marsh, Alexandria, *Shull*, no. 236. ONTARIO: swamp, Peele Island, August 21, 1914, *MacDaniels & Eames*. MICHIGAN: wet sandy border of Douglas Lake, Cheboygan Co., *Ehlers*, no. 234. OHIO: Oxford, Erie Co., September 2, 1895, *E. L. Moseley*. ILLINOIS: wet soil, Skokie Marsh, Glencoe, August 26, 1911, *E. E. Sherff*. IOWA: Ames, *E. Johnson*, no. 622. ARKANSAS: Hornersville, *Metcalf*, no. 642. ALBERTA: prairie slough, Castle Hill District, *Moodie*, no. 1144. MONTANA: Bitter-root valley, near Frenchtown, *S. Watson*, no. 342. CALIFORNIA: small pond north of Napa, *Suksdorf*, no. 723; Los Angeles. July, 1879, *Neriu*. OREGON: swamps, Swan Lake, Klamath Co., *Applegate*, no. 603; tules of Grande Ronde, *Cusick*, no. 1764. WASHINGTON: White Salmon, *Suksdorf*, no. 481.

3b. Forma **natans** (Wiegand), comb. nov. Stems floating or more or less submerged and rooting at the bottom: leaves 4–7 cm. wide, 10–15 cm. long, coriaceous or subcoriaceous, glabrous or glabrescent, ovate-lanceolate or lanceolate, cordate or rounded at base, acute (rarely obtuse); margins and ocreae ciliate; peduncles usually glandular-hairy. The specimens seen mostly sterile.

Polygonum coccineum var. *aquaticum* Willd. Enum. Hort. Berol. 428 (1809). *P. Muhlenbergii* forma *natans* Wiegand, RHODORA, xxvi. 3 (1924). Descriptions in literature cited under the forma

terrestre are usually broad enough to include this form. *Persicaria plattensis* Greene, Leaflets i. 29 (1904) in part; *P. alismaefolia* Greene, loc. cit. and probably other species there described, the types of which have not been seen and the descriptions of which do not justify definite disposal.

Occasional throughout the range of the typical form, but much less common, particularly in the region of the upper Mississippi basin. The following specimens are typical. QUEBEC: in dried pool, vicinity of Longueuil, *Victorin*, no. 4264. MAINE: Lake Christopher, Woodstock, 1887, *Parlin*. MASSACHUSETTS: Water Shop Pond, Springfield, *Andrews*, no. 6; Readville, *C. E. Faxon*. CONNECTICUT: Middlefield, August 22, 1907, *Andrews*; Misery Swamp, Southington, *Andrews*, no. 1 in part; Sleeper Pond, *Andrews*, no. 16; Boody Pond, *Andrews*, no. 18. Lake Saltonstall, New Haven, *D. C. Eaton*; East Hartford, September 13, 1897, *A. W. Driggs*. NEW YORK: western N. Y., *A. Gray*. WISCONSIN: Namekagon River, August 30, 1831, *Houghton*. SOUTH DAKOTA: vicinity of Brookings, July 9, 1896, *T. A. Williams*. WYOMING: ponds along river, Dunn's Ranch, Albany County, *A. Nelson*, no. 7598; Fairbanks, *A. Nelson*, no. 551. COLORADO: ponds, alt. 8000 feet, Tabogauche Basin, *Payson*, no. 173. CALIFORNIA: muddy bottomland, Owens River, Inyo Co. (eaten greedily by hogs), August, 1906, *S. P. Rexford*; banks of Russian River north of Cloverdale, Mendocino Co., *Heller*, no. 5283; about Mendocino, *Brewer*, no. 931. OREGON: standing water on Sauvie's Island, Multnomah Co., *J. C. Nelson*, no. 4443; wet meadows, Union Co., *Cusick*, 1878. WASHINGTON: Seattle, from *Herb. Young Naturalist's Soc.*; Pen d'Oreille River, *Dr. Lyall*.

The above were distributed as *P. Muhlenbergii*, *P. emersum* and *P. amphibium*.

3c. Var. **rigidulum** (Sheldon), comb. nov. An aquatic and emersed form; internodes of floating stems much swollen, 0.5–1.5 cm. in diameter and 10–15 cm. long; the nodes constricted; emersed portions with the nodes more or less swollen and the internodes tapering upward: leaves sharply lanceolate, very glabrous, or the upper becoming minutely but densely pubescent; bases rounded, rather inequilateral; petioles 5–10 cm. long, attached near the base of the ocrea; ocreae 1–5 cm. long, nearly glabrous, often coalescent with the epidermis; peduncle and ocreae minutely and densely glandular-hairy.

Polygonum rigidulum Sheldon, Bul. Geol. Nat. Hist. Surv. Minn. ix. 14 (1894). *Persicaria rigidula* (Sheldon) Greene, Leaflets i. 39 (1904); Nieuwland, Am. Mid. Nat. ii. 225 (1912). Ontario, Minnesota and South Dakota.

The following are referred here. ONTARIO: Massacre, *Macmillan & Sheldon*, no. 2407 (as *P. Muhlenbergii*). MINNESOTA: "From type coll." Nicollet, Nicollet Co., July, 1892, *C. A. Ballard*.

3d. Var. **pratinctola** (Greene), comb. nov. Terrestrial, more or less minutely canescent or pubescent with weak simple or simple and

glandular hairs: petioles mostly attached midway of the ocreae: ocreae mostly sharply acute and densely hairy: panicles narrowly cylindric and averaging somewhat longer than the type, the long-styled with a somewhat greater percentage of fertility than is usually found in the type; pollen of short-styled flowers mostly normal.

Persicaria pratincola Greene, Leaflets. i. 36 (1904). *P. spectabilis* Greene and *P. aboriginum* Greene, loc. cit. 37-44, and probably others of Greene's species of which types are not available. Indiana to the Dakotas, south to Texas and Mexico, in swamps or sand.

The following are referred here. INDIANA: Gibson, *Lansing*, no. 2831. WISCONSIN: Lapham. ILLINOIS: sand-dunes, Havana, August 12, 1893, *Gleason*. MINNESOTA: Lindstrom, Chicago Co., August, 1892, *Taylor*; near Moorhead, Red River Valley, *Ballard*, no. 2951. MISSOURI: low sandy bottoms, common, Jackson Co., *Bush*, no. 328; low prairie, Dodson, *Bush*, no. 4150; rich bottom, Sibley, *Bush*, no. 4176. NORTH DAKOTA: swamps, Leeds, August 7, 1899, *J. Lunell*; Fort Pembina, 1876, *Havard*. SOUTH DAKOTA: vicinity of Brookings, July 12, 1891, *Williams*. NEBRASKA: 3 miles northeast of Whitman, in dry lake, *Rydberg*, no. 1613; Kennedy, August 20, 1910, *Bates*. OKLAHOMA: Perkins, Payne Co., August 28, 1895, *J. W. Blankinship*; edge of pond, Copan, Washington Co., *Stevens*, no. 2104; Arkansas River, Creek Nation, August 22, 1895, *J. H. Kimmons*. TEXAS: *Wright*. MEXICO: Oaxaca, *Deam*, no. 16; Toluca, *Holway*, no. 3173.

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BIDENS HYPERBOREA AND ITS VARIETIES.

NORMAN C. FASSETT.

SIMILAR to *Bidens Eatoni* Fernald in its habitat, but more northern in its range, is *B. hyperborca* Greene. This species is confined to estuaries from James Bay to northeastern Massachusetts. *B. Eatoni* has been found only on the mouths of the larger rivers: the Hudson, the Quinnipiac, the Taunton, the Merrimac, and the Kennebec with its near neighbor the Sheepscot. *B. hyperborca*, on the other hand, is to be expected on the tidal shores of almost every fair-sized stream from the Merrimac to the St. Lawrence River, except in the Bay of Fundy and on the Atlantic coast of Nova Scotia.

Bidens hyperborca belongs to a group of three species which are characterized by having simple leaves and achenes with a convex cartilaginous summit. The characters pointed out by Professor Fernald in RHODORA xxiv. 206 (1922), differentiating this species

from *B. laevis* and *B. cernua*, prove, when applied to subsequent collections, to be constant, with one exception. *B. hyperborea* is described as having the disk-corollas 4-toothed; 4- and 5-toothed corollas may be found in one head.

Comparatively few botanists have collected this species, and a complete knowledge of all of its phases cannot be gained until fuller collections have been made. With the exception of a few specimens taken on the estuary of the Miramichi River, by Professors M. L. Fernald and A. S. Pease, the only material from New Brunswick available to the writer was collected by Mr. H. K. Svenson and himself in August, 1923, which was too early for mature plants. The New Brunswick plant is here tentatively referred to the same variety which is found on the St. Lawrence River estuary; future collections may demonstrate the incorrectness of this disposition. Some of the plants collected on the St. Lawrence estuary by Svenson & Fassett appear different from those collected by Brother Victorin the previous year, but for the present these plants are all treated as one variety.

Bidens hyperborea breaks up into the following varieties:

- a. Outer achenes 4-5 mm. long; the inner 5-7 mm. long, with marginal awns 1.8-3 mm. long *b*
 - b. Plant simple and monocephalous: leaves oblanceolate and blunt, entire or obscurely toothed.....var. *typica*.
 - b. Stem somewhat branching: leaves distinctly serrate.....var. *colpophila*.
- a. Outer achenes 6-8.5 mm. long; the inner 7.5-10 mm. long, with marginal awns 3-5 mm. long *c*
 - c. Branches ascending, making an angle with the stem of less than 45° *d*
 - d. Outer involucre bracts mostly linear, acute, rarely exceeding 2 mm. in width: leaves narrowly lanceolate, long attenuate, with 2-8 pairs of fine teeth seldom more than 0.5 mm. broad at base.....var. *cathancensis*.
 - d. Outer involucre bracts lanceolate, rarely linear, often obtuse, exceeding 2 mm. in width: leaves lanceolate, not very attenuate, with 1-5 pairs of coarse teeth 1 mm. or more broad at base.....var. *laurentiana*.
 - c. Branches spreading, making an angle with the stem of more than 45° *e*
 - e. Primary leaves with 0-3 pairs of teeth *f*
 - f. Leaves thin, with (1-)2-3 pairs of teeth: outer involucre bracts with 1, rarely 2, pairs of teeth; inner bracts broadly oblong, 3-4 mm. wide.....var. *Svensoni*.
 - f. Leaves fleshy, with 0-2 pairs of teeth: outer involucre bracts entire or rarely with 1 pair of teeth; inner bracts narrowly oblong, 2-3 mm. wide.....var. *gaspensis*.
 - e. Primary leaves with 4-6 pairs of teeth.....var. *arcuans*.

B. HYPERBOREA, var. *typica*. *B. hyperborea* Greene, Pittonia iv. 257 (1901). Known only from the original collection at Rupert House, James Bay, September 5, 1885, *J. M. Macoun*, no. 12056.

This, the only estuarine plant known from a river entering Hudson Bay, may indicate that many species having affinities with the more southern estuaries should be sought in this region.

B. HYPERBOREA, var. *COLPOPHILA* (Fernald & St. John) Fernald, *RHODORA* xx. 149 (1918). Estuaries from Northumberland Strait to northern Massachusetts. This is the most wide-spread of the known varieties of *B. hyperborea*, and shows many local variations in shape of involucre bracts, number of awns, toothings of leaves, and habit.—NEW BRUNSWICK: tidal mud of the Buctouche River, Coate Mills, August 20, 1923, *Svenson & Fassett*, no. 879; tidal shores, Shediac River, Shediac, August 23, 1924, *N. C. Fassett*, no. 2115. NOVA SCOTIA: tidal mudflats of River Philip, Oxford, August 24, 1924, *N. C. Fassett*, no. 2103. MAINE: tidal shores of Pleasant River, Columbia Falls, August 17, 1924, *N. C. Fassett*, nos. 2107 and 2109; Columbia Falls, August 20, 1924, *N. C. Fassett*, nos. 2102 and 2108; Columbia Falls, August 23, 1923, *Svenson & Fassett*, nos. 797 and 847; tidal shores of the Narraguagus River, Cherryfield, August 28, 1923, *Svenson & Fassett*, no. 878; Cherryfield, August 17, 1924, *N. C. Fassett*, no. 2131; tidal shores of the Harrington River, Harrington, August 17, 1924, *N. C. Fassett*; tidal shores of the Union River, Ellsworth, August 29, 1923, *Svenson & Fassett*, no. 848; Ellsworth, August 17, 1924, *N. C. Fassett*, nos. 2111 and 2112; tidal mudflats of the Penobscot River, Bangor, September 7, 1916, *Fernald & Long*, nos. 14829 and 14830; very abundant on muddy and gravelly tidal flats of the Penobscot River, Hampden, September 8, 1916, *Fernald & Long* in *Pl. Exsicc. Gray*, no. 296; tidal mudflats at mouth of Souadabscook Stream, Hampden, September 11, 1916, *Fernald & Long*, nos. 14833 and 14834; tidal mudflats at the mouth of Reed Brook, Hampden, September 8, 1916, *Fernald & Long*, nos. 14831 and 14832; tidal flats of the Sheepscot River, Alna, August 14, 1922, *N. C. Fassett*, no. 292; borders of salt marsh, Back River Creek, Woolwich September 15, 1915, *Fernald & Long*, no. 14826; above tide-limit at edge of marsh and among sedges and rushes of salt marsh, Winnegance Creek, Phippsburg, August 23, 1909, *M. L. Fernald*, nos. 2248 and 2249 (TYPE in Herb. New England Bot. Club); stony beach, tidal shores of the Kennebec River, Gardiner, September 18, 1923, *N. C. Fassett*, no. 884; tidal shores of the Kennebec River, West Woolwich, September 8, 1924, *N. C. Fassett*, no. 2106; tidal shores of the Kennebec River, Richmond Campground, September 16, 1924, *N. C. Fassett*, no. 2129; Cow Island, Topsham, August, 1910, *Kate Furbish*; bank of Androscoggin River, Brunswick, August 13, 1911, *C. H. Bissell*; Brunswick, August 22, 1911, *R. A. Ware*, no. 4230; tidal shores of the Mousam River, Kennebunk, September 22, 1923, *N. C. Fassett*, no. 895; Kennebunk, August 15, 1924, *N. C. Fassett*, no. 2114. NEW HAMPSHIRE: tidal shores of the Salmon Falls River, Salmon Falls, September 22, 1923, *N. C. Fassett*, no. 794. MASSACHUSETTS: brackish muddy shore [of Merrimac River], Newburyport, October 2,

1902, *Eaton & Fernald*; tidal shores, Mill Creek, Rowley, September 22, 1923, *N. C. Fassett*, no. 789; Rowley, August 15, 1924, *N. C. Fassett*, no. 2113.

B. HYPERBOREA, var. *CATHANCENSIS* Fernald, l. c. Estuary of the Kennebec River, and other rivers of this estuarine system.—MAINE: tidal mudflats of Cathance River, Bowdoinham, September 14 and 19, 1916, *Fernald & Long*, nos. 14825, 14827 (TYPE in Gray Herb.), 14828, also in *Pl. Exsicc. Gray.* no. 295; tidal shores, mouth of West Branch, Bowdoinham, August, 1921, *N. C. Fassett*, no. 911; tidal shores of Merrymeeting Bay, Bowdoinham, August 23, 1921, *N. C. Fassett*, no. 910; tidal shores of the Kennebec River, East Bowdoinham, August 24, 1921, *N. C. Fassett*, no. 160; tidal shores at the mouth of Eastern River, Dresden, September 13, 1924, *N. C. Fassett*, no. 2121; tidal shores, Kennebec River, Hatch's Corner, Dresden, September 9, 1924, *N. C. Fassett*, no. 2117.

B. HYPERBOREA, var. *laurentiana*, n. var., planta 1-3 dm. alta subsimplex ramis ascendentibus supra vel ramis tenuibus infra; foliis lanceolatis non attenuatis primariis 3-11 cm. longis, dentibus utrinque 1-5 obtusis plerumque grossis; bracteis involucri exterioribus 3-6 lanceolatis obtusis 1-3.5(-4.5) cm. longis 1.5-5(-8) mm. latis, plerumque integris rare dentibus utrinque 1-2; achaeniis exterioribus 7-8 mm. longis, interioribus 8-10 mm. longis aristis marginalibus 3.5-4 mm. longis.

Plant 1-3 dm. tall, subsimple, with ascending branches above, sometimes with weak ascending branches below: leaves of the primary stem 3-11 cm. long, ascending, lanceolate, not attenuate, with 1-3 pairs of blunt, usually coarse, teeth: outer involucre bracts 3-6, lanceolate, obtuse at tip, 1-3.5(-4.5) cm. long, 1.5-5(-8) mm. broad, usually entire, the largest rarely with 1-2 pairs of teeth: outer achenes 7-8 mm. long; inner achenes 8-10 mm. long; awns 4, the outer pair 3.5-4 mm. long.—Estuary of the St. Lawrence River, and perhaps on estuaries from Chaleur Bay to Northumberland Strait, New Brunswick.—QUEBEC: Cap-Rouge, un peu plus haut que le Pont de Québec. Rivages sur la zone intercotidale, avec *Gentiana Victorinii*, 29 août 1922, *Fr. M.-Victorin*, no. 15461 (TYPE in Gray Herb.); grèves de Beauport, près de Québec. Sur la zone intercotidale, 6 août 1922, *Fr. Rolland*, no. 15460; Saint-François de l'Isle d'Orléans, rivages, sur la zone intercotidale, 24 août 1922, *Fr. M.-Victorin*, no. 15459; tidal flats of the St. Lawrence River, St. Jean-Port-Joli, August 10, 1923, *Svenson & Fassett*, no. 912; muddy tidal shore of the Boyer River, St. Vallier, August 9, 1923, *Svenson & Fassett*, no. 855.—The following collections are mostly immature, but seem best treated with this variety. QUEBEC: brackish shore, submerged at high tide, alluvial islands at the mouth of the Bonaventure River, August 4, 1904, *Collins, Fernald & Pease*; dead waters, between Baldé and the Baie des Chaleurs, August 5, 6 and 8, 1904, *Collins, Fernald & Pease*, no. 5871. NEW BRUNSWICK: tidal flats of the Restigouche

River, Head of Tide, August 16, 1923, *Svenson & Fassett*, nos. 893, 897 and 898; tidal shores of Eel River, Dalhousie, August 16, 1923, *Svenson & Fassett*, no. 882; estuary of the Jacquet River, Durham, August 17, 1923, *Svenson & Fassett*, no. 819; tidal flats of the Teta-gouche River, Bathurst, August 17, 1923, *Svenson & Fassett*, no. 887; tidal shores of the Tabusintac River, Almwick, August 18, 1923, *Svenson & Fassett*, no. 883; tidal shores of the Miramichi River, Newcastle, August 19, 1923, *Svenson & Fassett*, no. 896; tidal flats of the Miramichi River 5 miles above Newcastle, August 19, 1923, *Svenson & Fassett*, no. 846; tidal flats of the Kouchibouguac River, Charleton, August 20, 1923, *Svenson & Fassett*, no. 888; tidal shores of the Kouchibouguacis River, Bretagne, August 20, 1923, *Svenson & Fassett*, no. 886.

B. HYPERBOREA, var. **Svensoni**, n. var., planta 1-2.5 dm. alta ramis imis arcuato-ascendentibus var. *gaspensem* simulans vel subsimplex; foliis extendentibus ascendentibusve obtusis, dentibus utrinque 1-3 grossis obtusis; bracteis involucri exterioribus (2-)3-4, lanceolatis obtusis utrinque cum dentibus obtusis 1, rare 2 instructis; bracteis interioribus 7-9 mm. longis ad apicem subrotundis; achaeniis exterioribus 6 mm. longis, interioribus 8 mm. longis, aristis marginalibus 2.5-3 mm. longis.

Plant 1-2.5 dm. tall, with arcuate lower branches as in var. *gaspensis* or sometimes subsimple: leaves of the primary stem 4-6 cm. long, spreading or ascending, blunt at tip, with 1-3 pairs of coarse teeth: outer involucre bracts (2-)3-4, lanceolate, obtuse at tip, with 1, rarely 2, pairs of teeth; inner bracts 7-9 mm. long, somewhat rounded at the tip: outer achenes 6 mm. long; inner achenes 8 mm. long; awns 4, the outer pair 2.5-3 mm. long.—QUEBEC: tidal shores, Rimouski River, Rimouski, August 14, 1923, *Svenson & Fassett*, nos. 936 (TYPE in Gray Herb.) and 899.

Intermediate between varieties *gaspensis* and *laurentiana*. The former it approaches in its usually much branched habit, but differs in the texture and toothiness of the leaves and outer involucre bracts. In these it approaches, but does not simulate, var. *laurentiana*.

Named for Mr. H. K. Svenson, whose good companionship and persistence in the face of trying circumstances did much to make the collecting trip of 1923 a successful one.

B. HYPERBOREA, var. *GASPENSIS* Fernald, RHODORA xx. 150 (1918). QUEBEC: brackish shores, submerged at high tide, mouth of the St. John River, Douglstown, August 23, 1904, *Collins, Fernald & Pease*; submerged at high tide, brackish shores about the mouth of Dartmouth River, August 26 and 27, 1904, *Collins, Fernald & Pease*.

B. HYPERBOREA, var. *ARCUANS* Fernald, RHODORA xxv. 44 (1923). Known from only one collection, in NEW BRUNSWICK, tidal mud of the Miramichi River, Newcastle, July 30, 1922, *Fernald & Pease*, no. 25321. Svenson and Fassett, collecting on the estuary of the Miramichi River the year after this variety had been discovered,

found no specimens matching those collected by Fernald and Pease. The latter two collected farther down the river than did the former, hence in more brackish water, so it may be that this variety is more tolerant of salinity than is var. *laurentiana*. Var. *arcuans* must be earlier in its flowering than is var. *laurentiana*, for satisfactory fruiting material of the latter can hardly be found in the middle of August, while the former, collected on July 30, had some mature achenes in the heads.

BIDENS cernua × *hyperborea*, var. *colpophila*, hyb. nov., planta 1.5–3 dm. alta subsimplex vel cum ramis tenuibus infra munitis; foliis primariis 5–8 cm. longis extendentibus subascendentibusve attenuatis, dentibus acutis utrinque 1–6; capitulis campanulatis vel hemisphaericis ad anthesem erectis; bracteis involucri exterioribus 4–5, extendentibus vel ascendentibus 1–2 cm. longis; achaeniis curvatis in costis prominentibus marginibus suberosis substriatulis.

Plant 1.5–3 dm. tall, subsimple or with weak branches below: leaves of the primary stem 5–8 cm. long, spreading or subascending, attenuate, with 1–6 pairs of sharp teeth: heads campanulate to hemispherical, erect in anthesis; outer involucre bracts 4–5, spreading to ascending, 1–2 cm. long: achenes curved, with prominent midribs and corky margins, obscurely striate.—With the habit of *B. hyperborea*, and the achenes of *B. cernua*.—MAINE: Nonesuch River, Scarborough, September 25, 1924, Norton, Welden & Haren (TYPE in Gray Herb.); Nonesuch River, Scarborough, August 20, 1919, A. H. Norton.

GRADUATE SCHOOL OF ARTS AND SCIENCES, *Harvard University*.

ERYSIMUM Pallasii (Pursh), n. comb.—*Cheiranthus Pallasii* Pursh, Fl. Am. Sept. ii. 436 (1814). *C. pygmaeus* Adams, Mém. Soc. Nat. Mosc. v. 114 (1817). *Hesperis pygmaea* (Pursh) Hook. Fl. Bor.-Am. i. 60, t. 90 (1830). *H. minima* T. & G. Fl. N. A. i. 90 (1838). *H. Hookeri* Ledeb. Fl. Ross. i. 174 (1841). *Erysimum pygmaeum* (Adams) Gay, Erys. Nov. 4 (1842). *Hesp. Pallasii* (Pursh) Seem. Bot. Herald, 24 (1852). *Sisymbrium pygmaeum* (Pursh) Trautv. Act. Hort. Petrop. i. 60 (1871).

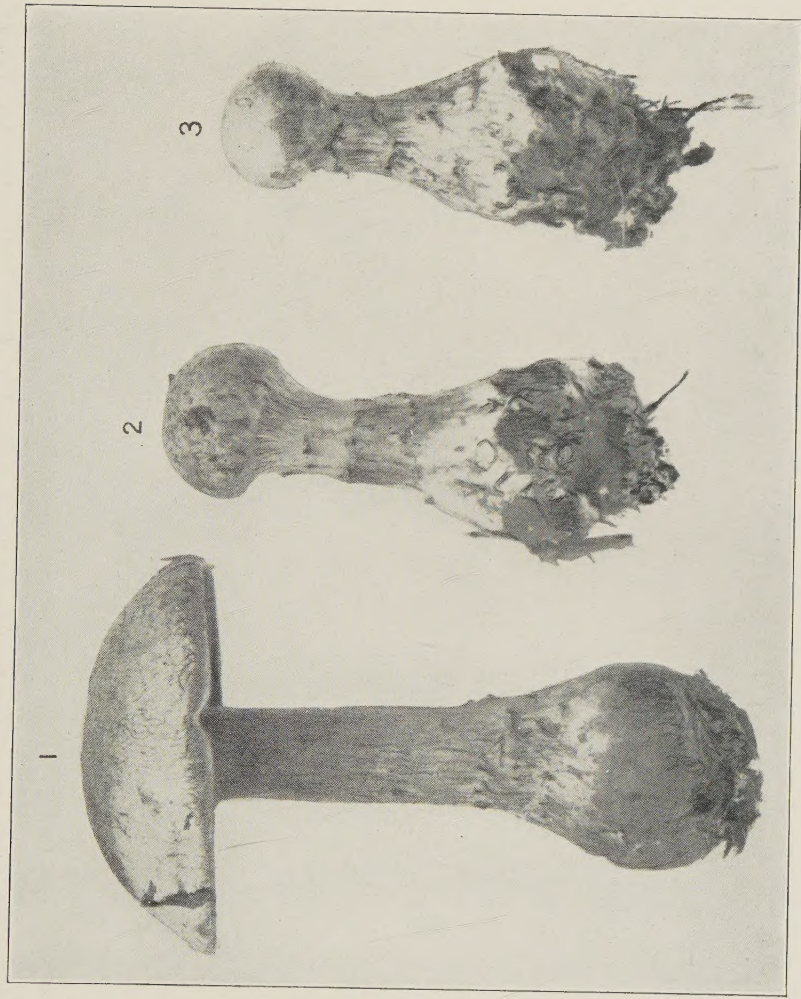
This beautiful purple-flowered arctic species has recently been known as *Erysimum pygmaeum* or by those who merge it with *Hesperis* as *H. Pallasii*. The latter combination is generally ascribed to Torrey & Gray, who certainly did not make it. They called it *Hesperis minima*, but added the note: "Sir William Hooker is inclined to refer to this species *Cheiranthus Pallasii*, Pursh, . . . If his suspicion is confirmed, Pursh's specific name must be adopted."—M. L. FERNALD, Gray Herbarium.

MARK ALFRED CARLETON died April 26, 1925, in Paita, Peru, from an attack of malaria. He was born near Jerusalem, Ohio, March 7, 1866. For several years, subsequent to March 1894, Carleton was in the service of the United States Department of Agriculture. In this capacity he gave special attention to cereal diseases and established the physiological relationships of nearly all the cereal rusts of this country. He visited in 1898 and 1899 Russia and Siberia in search of rust-resisting and drought-resisting cereals, and he introduced to this country many Eurasian cereals which have proved highly advantageous to American agriculture. Among European scientists Carleton was the most widely recognized American phytopathologist. His death is a great loss to science.—THEO. HOLM, Clinton, Maryland.

Vol. 27, no. 320, including pages 133 to 152, was issued 26 September, 1925.



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